Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	IB Docket No. 95-91
	)	GEN Docket No. 90-357
	)	RM No. 8610
Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band	)	

To: The Commission

MOTION TO ACCEPT LATE FILED PLEADING OR IN THE ALTERNATIVE, TO STRIKE CRACKER BARREL'S REPLY

Primosphere Limited Partnership ("Primosphere"), by its attorneys, hereby petitions the Commission to accept its attached Response to the Reply of Cracker Barrel Old Country Store, Inc. ("Cracker Barrel") filed in the above-captioned proceeding. In the alternative, Primosphere moves to strike Cracker Barrel's Reply.

In its Comments submitted in this Proceeding, Cracker Barrel submitted an unsupported analysis of a proposed band usage plan that purported to radically increase the potential number of Satellite Digital Audio Radio Service ("SDARS") systems that could operate in the 2310 - 2360 MHz band by using CDMA technology. No engineering certification was submitted in support of this claim. Primosphere addressed in its Reply Comments the claims made in Cracker Barrel's comments.

In its Reply Comments, Cracker Barrel revised drastically its claim of spectrum efficiency. As part of this Reply, Cracker Barrel attached a technical affidavit prepared by a consulting engineer in support of its now reduced claim.

By introducing new substantive material in the reply phase of the comment period, Cracker Barrel deprived affected parties of an opportunity to address these new and substantially altered claims. In addition, Cracker Barrel supported its claims by an engineering statement which had not been included in its initial filing. This was a clear violation of Section 1.45 of the Commission's rules which limits replies to issues raised in the comments.[1]

In response to this Reply, Primosphere utilized a consulting engineer to analyze the claims made in Cracker Barrel's Reply in order to prepare an appropriate response. Primosphere is submitting this Response at the earliest possible time after completion of the engineering study. Acceptance of this pleading will not in any way prejudice Cracker Barrel. Cracker Barrel has submitted new material and should allow others the opportunity to address this material. In contrast, not accepting this Response will be highly prejudicial to Primosphere and other SDARS proponents. Cracker Barrel has submitted new material in this docket, in violation of the Commission's Rules, at a juncture in the proceeding that did not allow for a response by affected parties. It is Cracker Barrel's own dilatory behavior which necessitates this late filed pleading.

The study submitted by Cracker Barrel in its Reply addresses numerous issues that are vital to the development of licensing rules for SDARS. Cracker Barrel's proposal implicates the issues of mutual exclusivity, spectrum efficiency as well as the sharing plan proposed by the four pending applicants. It is imperative that the Commission either dismiss the one-sided claims submitted by

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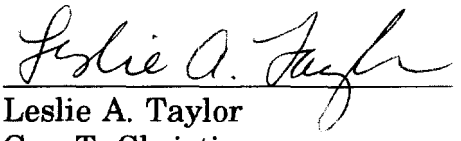
[1] See Amendment of § 73.202(b), Table of Allotments, 2 FCC Rcd 1386 (1987) at n.1 (explaining that reply comments in rulemaking were rejected "since they provide new information to which no party could respond in an authorized pleading.").

Cracker Barrel or accept the attached pleading in response to the new claims made in Cracker Barrel's reply.

For the reasons stated above, Primosphere requests that the Commission either accept its Response to Reply Comments filed by Cracker Barrel Old Country Store, Inc. or, in the alternative, strike Cracker Barrel's Reply.

Respectfully submitted,

PRIMOSPHERE LIMITED PARTNERSHIP

By: 

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Its Attorneys

February 27, 1996

Before the
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In the Matter of	)	IB Docket No. 95-91
	)	GEN Docket No. 90-357
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Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band	)	

To: The Commission

RESPONSE TO THE REPLY COMMENTS OF CRACKER BARREL OLD COUNTRY STORE, INC.

Primosphere Limited Partnership ("Primosphere"), by its attorneys, hereby submits its Response to the Reply of Cracker Barrel Old Country Store, Inc. ("Cracker Barrel") in the above-captioned proceeding.

In its Notice of Proposed Rulemaking, the Commission requested comment on the number of applicants that could be accommodated in the bands currently allocated to the Satellite Digital Audio Radio Service ("SDARS").[1] In joint comments filed by the four pending SDARS applicants, Primosphere, CD Radio, DSBC and AMRC all agreed that only four applicants could be accommodated in the available spectrum.[2] Cracker Barrel submitted a band plan in its Comments which claimed that up to 15 systems could be accommodated in the 50 MHz SDARS band using CDMA techniques.[3] No other party submitted a technical

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1 Notice of Proposed Rulemaking at 31.

2 See Joint Comments of the SDARS Applicants (filed September 15, 1995) at 2.

3 Comments of Cracker Barrel at 11.

challenge to the claim of the four SDARS applicants.[4] Primosphere demonstrated in its Reply comments that this claim was both unsupported and incorrect.

In a radical and unexpected departure from its prior stance, Cracker Barrel advanced a totally new band analysis in its Reply Comments, claiming that only six systems could be supported in the available bandwidth.[5] The only explanation given by Cracker Barrel for the much larger estimate given in its prior filing is noted in a footnote: "the large number of licensees would be made possible primarily because of the use of multiple spot beams."[6] In advancing these two contradictory positions, Cracker Barrel demonstrates its fundamental lack of understanding of satellite engineering and calls into question its sincerity in advancing its arguments.

The following chart below outlines the drastic change in the claims regarding channel capacity and number of systems made in Cracker Barrel's initial Comments and its Reply Comments.

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[4] Comments submitted by the National Association of Broadcasters and others made unsupported assertions that spectrum could support additional applicants, but provided no technical basis for these claims. These comments were addressed in Primosphere's Reply comments. Cracker Barrel's claims are unique because they are the only substantive claims raised in the reply period.

[5] Reply Comments of Cracker Barrel at 9.

[6] Id., n. 16.

Cracker Barrel Submissions

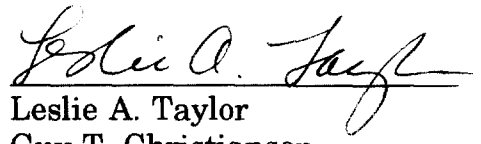
	Comments (CDMA)	**Reply** (TDMA version)	**Reply** (CDMA version)
No. of Systems	15	6	6
No. of channels	465	30	32
Bandwidth per Channel (MHz)	7	8.32	8.064
No. of Beams	10 Regional	1 CONUS	1 CONUS

Although the claims made by Cracker Barrel in its Reply are supported by an engineering statement (unlike those made in its comments), the claims, nonetheless, remain incorrect. As shown in the attached engineering analysis prepared by Richard Cooperman, Cracker Barrel's new claims are based in theory and have little foundation in the real-world conditions under which an SDARS systems must operate. While Cracker Barrel may be able to demonstrate on paper, unfettered by the constraints of system cost, satellite size and weight, and system performance, that six systems can be accommodated in the 50 MHz SDARS band, its theoretical demonstration is not readily transferred to the real world. The attached engineering analysis demonstrates that the band plan Cracker Barrel envisions cannot be brought into being because it is too expensive, ignores sharing and coordination issues, and cannot support a link margin sufficient to ensure satisfactory reception.

When the issues ignored by Cracker Barrel are taken into account, the result is that four systems can be accommodated in the 50 MHz of spectrum available for SDARS. This is consistent with the arguments and demonstrations of Primosphere and the other SDARS applicants. Cracker Barrel's Reply, therefore, adds little to this proceeding. Contrary to Cracker Barrel's assertions, its new technical information does not present a way to accommodate more than four systems in the available spectrum. The Commission must evaluate Cracker Barrel's submissions for what they are: technically deficient, grossly contradictory, and self-serving. In no way can Cracker Barrel's comments provide a basis for determining the capacity of the 2310 - 2360 MHz band for the SDARS systems.

Respectfully submitted,

PRIMOSPHERE LIMITED PARTNERSHIP

By: 

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Engineering Analysis
Prepared by Richard S. Cooperman

Cracker Barrel Old Country Stores, Inc. ("Cracker Barrel") has argued in its Reply Comments that the spectrum allocated for SDARS can host more licensees than the four present applicants. It presents in support of its position an Appendix to its Reply Comments in the form of Comments prepared by Laurence B. Milstein, Ph.D. (E.E.) of the University of California, San Diego, Department of Electrical and Computer Engineering. The arguments advanced in the Cracker Barrel Reply Comments not only fail to prove the point advanced by Cracker Barrel, they display a high degree of misunderstanding of satellite-based communications system design. The very basic assumptions used in the new design are again seriously flawed. Cracker Barrel misuses the technical material contained in Dr. Milstein's Comments.

Cracker Barrel originally claimed in its Comments, without any technical showing, that SDARS spectrum could support 15 licensees. Much of its reasoning was based on misplaced faith in the use of CDMA as a spectrum multiplier. Cracker Barrel then confused the issue further by suggesting it would use ten regional spot beams to provide service, thus rendering its argument useless with respect to licensing for a national service.

With its Reply Comments, Cracker Barrel introduces a second attempt at a viable SDARS band plan and submits a proposed system design that is totally different from the one submitted in its Comments. It is interesting to note that Dr. Milstein's analysis does not at all support the initial Cracker Barrel claims regarding CDMA efficiency advanced in Cracker Barrel's Comments. In fact, Dr. Milstein admits that CDMA has no significant

capacity advantage over TDMA.[1] Thus, according to its own expert, Cracker Barrel's initial spectrum analysis was inaccurate.

While the new spectrum analysis advanced by Dr. Milstein may be technically accurate, it is now economically unsound and the quality of its performance in the mobile environment is questionable. The system analysis advanced by Dr. Milstein is based on two basic assumptions: use of higher order modulation and elimination of space diversity. Clearly a system using higher order modulation without space diversity will have reduced spectrum requirements. Unfortunately, there are economic and performance issues that preclude a system design based on these two assumptions.

Cracker Barrel's technical exhibit does not contain even a rudimentary satellite system design analysis. Most notably missing from the exhibit is a link budget, which is required by the Commission as a basic showing of system feasibility. Dr. Milstein's analysis is merely a rudimentary and academic tutorial exercise in communications theory that fails to take into account any of the realities of satellite operation. In fact, the word "satellite" is mentioned only once by Dr. Milstein - in the very first sentence.

An experienced satellite communications system designer takes into account market/customer requirements, available technology and implementation cost as input to a parallel process of design trade-offs to develop a system design that is both technically and economically viable. As an academic exercise, it is easy to increase satellite power and use higher order modulation to achieve improved performance and expanded capacity.

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[1] See Cracker Barrel Reply Comments, Appendix A at 1 & 2.

In the real world, however, such trade-offs have an economic cost. A system using higher order modulation, such as 16-QAM, must have linear satellite transponders to preserve the signal. This greatly increases the power requirements of the satellite transponders, requiring a larger - and more costly - satellite and booster. There are limits at present on the amount of power a commercial communications satellite can generate and the size of a satellite that can be lofted into geostationary orbit.

Now employing the material in the engineering tutorial provided by Dr. Milstein, Cracker Barrel asserts that the same SDARS spectrum can support six licensees, each providing 30 channels of programming. There is nothing wrong with Dr. Milstein's calculations; he confirms the claims already made by Primosphere and other applicants. Dr. Milstein's theoretical calculations, however, make no allowance for application in the real world.

Essentially, Dr. Milstein's approach is based on the use of one satellite, not two as Primosphere and CD Radio have planned, and the use of significantly more satellite power. As noted by Dr. Milstein, the satellite transponders in the latest Cracker Barrel system design must operate in the linear mode. This will require a back off of at least 6 dB from saturation. In addition a satellite down link with a 16-QAM signal will require at least 3 dB higher transmitter power. Thus, the satellite design now advanced by Cracker Barrel would require on the order of EIGHT times or more the power of the communications satellite payload as contemplated by Primosphere and other applicants. Primosphere's system contemplates the use of roughly 1.0 kW of transmitter power and requires 2.5 kW of satellite bus power. In order to run the type of signal described in Dr. Milstein's analysis, one would have to utilize roughly 15 to 20 kW watts of satellite bus power for the communications payload. It should be

noted that the recently introduced and yet to be launched, Hughes HS702 satellite bus - one of the most powerful and advanced commercial buses ever designed - can deliver only 11 kW of satellite bus power to a communications payload. The estimated cost of the HS 702 is several time the cost of the class of satellite contemplated by the Applicants.

Economic reality dictates the use of satellites of a size and cost suitable for the services which they will provide. This, in turn, has a direct effect on spectrum efficiency and therefore the number of licensees a given satellite service can support. Even Dr. Milstein admits that there is an economic cost in using higher order modulation when he notes: "These penalties are not likely to be trivial ones..."[2]

Also absent from Dr. Milstein's analysis is the constraint on satellite power placed on SDARS by our neighbors in Canada and Mexico. Increasing satellite power greatly complicates the coordination process with these two countries. An increase in the satellite power would result in a higher power flux density on the ground, not just in the U.S., but also in neighboring countries. The Radio Regulations provide a limit on the pfd in the 2310 - 2360 MHZ band with which Primosphere's system now complies. Increasing the power to the extent needed to achieve Dr. Milstein's projections would make it much more difficult, if not impossible, to comply with this pfd limit.

Primosphere and other applicants have long been aware of these basic facts and have rejected higher order modulation. Neither Cracker Barrel nor Dr. Milstein has revealed knowledge of any technical breakthrough that might dictate otherwise. Furthermore, neither has suggested some perturbation of the laws

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[2] Ibid, page 3.

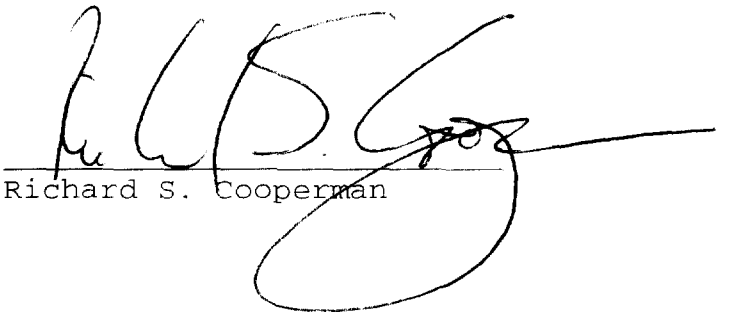
of economics or business theory that would permit an enterprise to succeed where the cost of constructing a system exceeds the revenues it can be expected to return.

Dr. Milstein assumes that each of the five or six potential licensees would use only one satellite. This assumption ignores the large body of mobile satellite propagation data collected by NASA's Jet Propulsion Laboratory and others. This data clearly shows that quality SDARS service requires the use of two satellites to mitigate signal disturbances. Primosphere and CD Radio believe the American consumer requires a quality SDARS service and have proposed to invest in a two satellite system to meet this requirement. Cracker Barrel ignores this fact and its impact on spectral efficiency.

Taken as a whole, Cracker Barrel's technical analysis falls woefully short of the claims it purports to prove. By ignoring such basic items as a link budget, spacecraft power constraints, international coordination difficulties, signal propagation, and system cost, Cracker Barrel has put forward little more than a chalkboard lesson in TDMA fundamentals. It has not, however, shown that more than four systems can be accommodated in the currently allocated SDARS spectrum.

Engineering Certification

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this Engineering Analysis, that I am familiar with Part 25 of the Commission's Rules, that I have either prepared or reviewed the engineering information submitted in this Engineering Analysis and that it is complete and accurate to the best of my knowledge.



Richard S. Cooperman

CERTIFICATE OF SERVICE

I, Andrew F. Taylor, hereby certify that on this 28th day of February, 1996, copies of the foregoing "Motion to Accept Late Filed Pleading or in the Alternative, to Strike Cracker Barrel's Reply" were mailed, postage prepaid, to the following:

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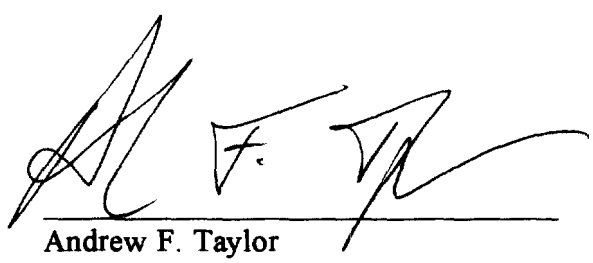

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*Hand Delivered